

# ICT skills are substantially rewarded in modern labour markets

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“The new literacy” is the term Neelie Kroes, former Vice President of the European Commission, uses to describe an individual’s skill in mastering information and communication technologies (ICT). She continues to explain that “the online world is becoming a bigger part of everything we do. No wonder these [ICT] skills are becoming central in the job market.” However, although there is the widespread belief that ICT skills, i.e. the ability of getting along in the digital world, matter for labour-market outcomes, rigorous empirical evidence on the wage effects of ICT skills has not yet been provided.

Using novel data on ICT skills from PIAAC – the OECD’s “PISA for Adults”, we show that ICT skills are substantially rewarded in modern labour markets. These data are unique as they provide objective measures of ICT skills in 19 developed economies, which can be compared within and across countries. Instead, previous studies relied on measures of ICT skills reported by survey participants themselves in rough categories, which are prone to substantial mismeasurement.

We show that one additional point in the ICT skills assessment is associated with roughly a 0.6 per cent wage increase. This implies that if an average worker in the United States – a country with ICT skills below the OECD average – increased her ICT skills to the level of an average worker in Japan – the top-performing country (see Figure 1) – her wages would increase by about 8 per cent. This effect size is similar to the wage effect of an additional year of schooling in developed countries. Estimated returns to ICT skills are very similar in an international setting, exploiting cross-country variation in ICT skills, and in a within-country setting, exploiting variation at a fine geographic scale within Germany.

The major empirical challenge was to assess whether the estimated association between ICT skills and wages indeed depicts a causal effect. A prime concern is that more able people may be more likely to accumulate ICT skills and may independently receive higher earnings because of their higher ability. Also, better jobs may more likely use and reinforce skills or they may provide the resources to invest in adult education, training, or computer courses.

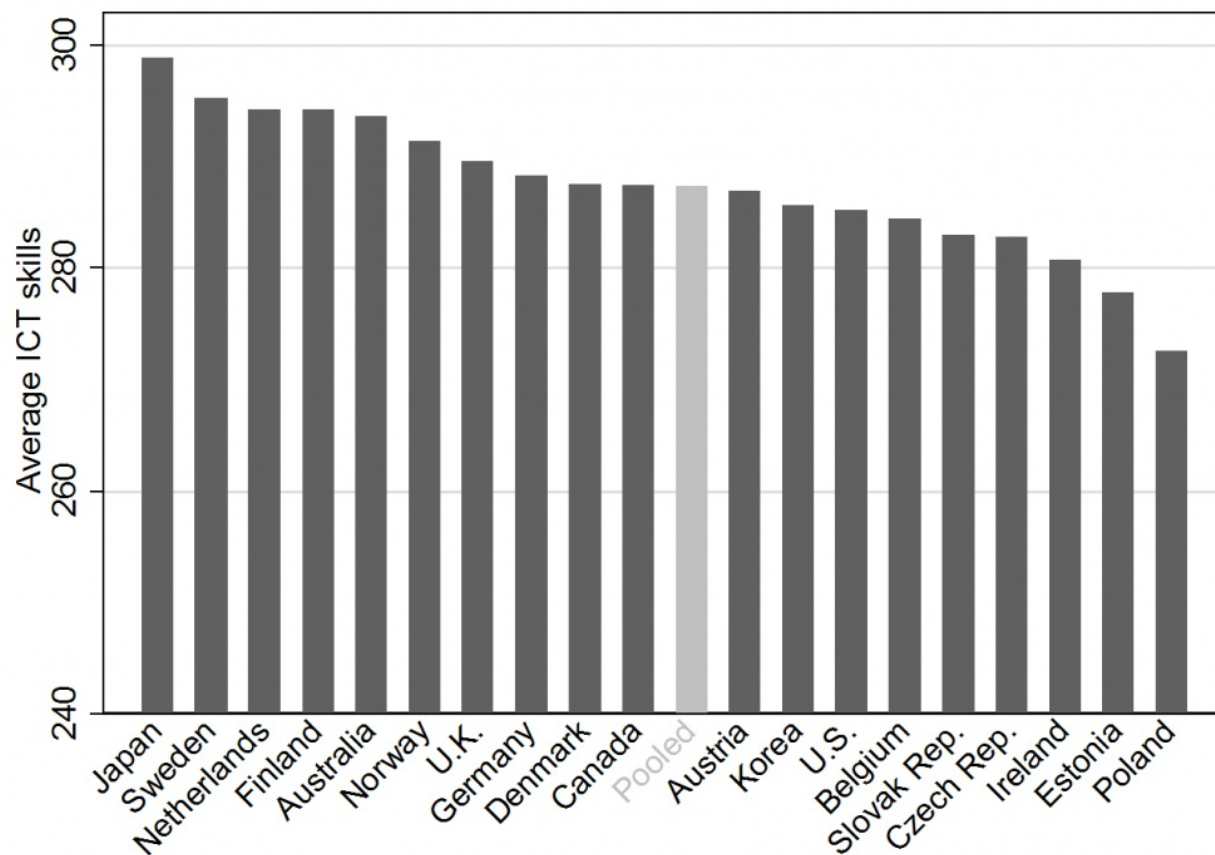
These are only two examples of the potential problems in a simple estimation of the wage returns to ICT skills. To address these problems, we exploit technological peculiarities in the broadband Internet infrastructure, because of which some persons got access to high-speed Internet earlier than others simply by chance. We show that having (early) Internet access kickstarts learning-by-doing in ICT skills.

In our first empirical strategy, we exploit the fact that existing voice-telephony networks were upgraded in most countries to provide broadband access. In consequence, countries with better-developed voice-telephony networks before the introduction of broadband in the late 1990s or early 2000s could roll out broadband faster than countries lagging behind in voice-telephony infrastructure. Our second empirical strategy makes use of the fact that some German municipalities, by chance, are too far away from the necessary infrastructure to have early access to broadband. We observe that people who were lucky enough to have early broadband access, because they live either in a country with a well-developed traditional voice-telephony network or close enough to the appropriate infrastructure in Germany, have higher ICT skills than their unlucky counterparts, but do not differ from them in their numeracy or literacy skills, which were also tested in PIAAC.

Concerning the channels through which ICT skills affect wages, we find that the positive wage returns can partly be attributed to the fact that individuals with higher ICT skills often work in jobs that involve abstract tasks (requiring problem solving, adaptability, and creativity), which pay substantial wage premia. At the same time, people with high ICT skills work less often in jobs that are routine in nature, and are therefore easily automatable. This is in line with the idea that the proliferation of computers amplifies the comparative advantage of those workers engaged in abstract tasks, and substitutes for workers performing routine tasks.

By showing that ICT skills are rewarded quite substantially in the labour market, our results support Neelie Kroes's notion of ICT skills as "the new literacy." Since ICT skills are likely to become increasingly important in our increasingly technology-rich world, their acquisition (or absence) has serious implications for individual labour market success and overall inequality. Thus, the rather lackluster performance of some European countries in the PIAAC assessment of ICT skills is all the more worrisome – in particular, the post-communist countries and Ireland constitute the bottom of the international league tables (see Figure 1). However, we show that ensuring access to the Internet so as to kick-start learning-by-doing is an effective way of reducing the wage gap between "digital natives"—those who are capable of using modern ICT tools to get along in a digital world—and digital illiterates. This is especially important for the discussion about social inequality in access to the Internet, also known as the "digital divide." The fundamental insight of this paper—that ICT skills can be promoted by providing access to ICT infrastructure—suggests that the efforts by policy-makers worldwide to expand broadband coverage (e.g., the EU's "Digital Agenda") may prevent a drifting apart in employment opportunities when advances in ICT change job demands.

## **Figure 1: ICT Skills around the World**



**Notes:** Average ICT skills by country. **Sample:** employees aged 20–65 years, no first-generation immigrants. **Data source:** PIAAC.



*Notes:*

- This article is based on the authors' paper [Returns to ICT Skills](#), CESifo Working Paper No. 5720 (2016), presented at 31st annual congress of the European Economic Association, Geneva, August 2016.
- The post gives the views of its author, not the position of LSE Business Review or the London School of Economics.
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